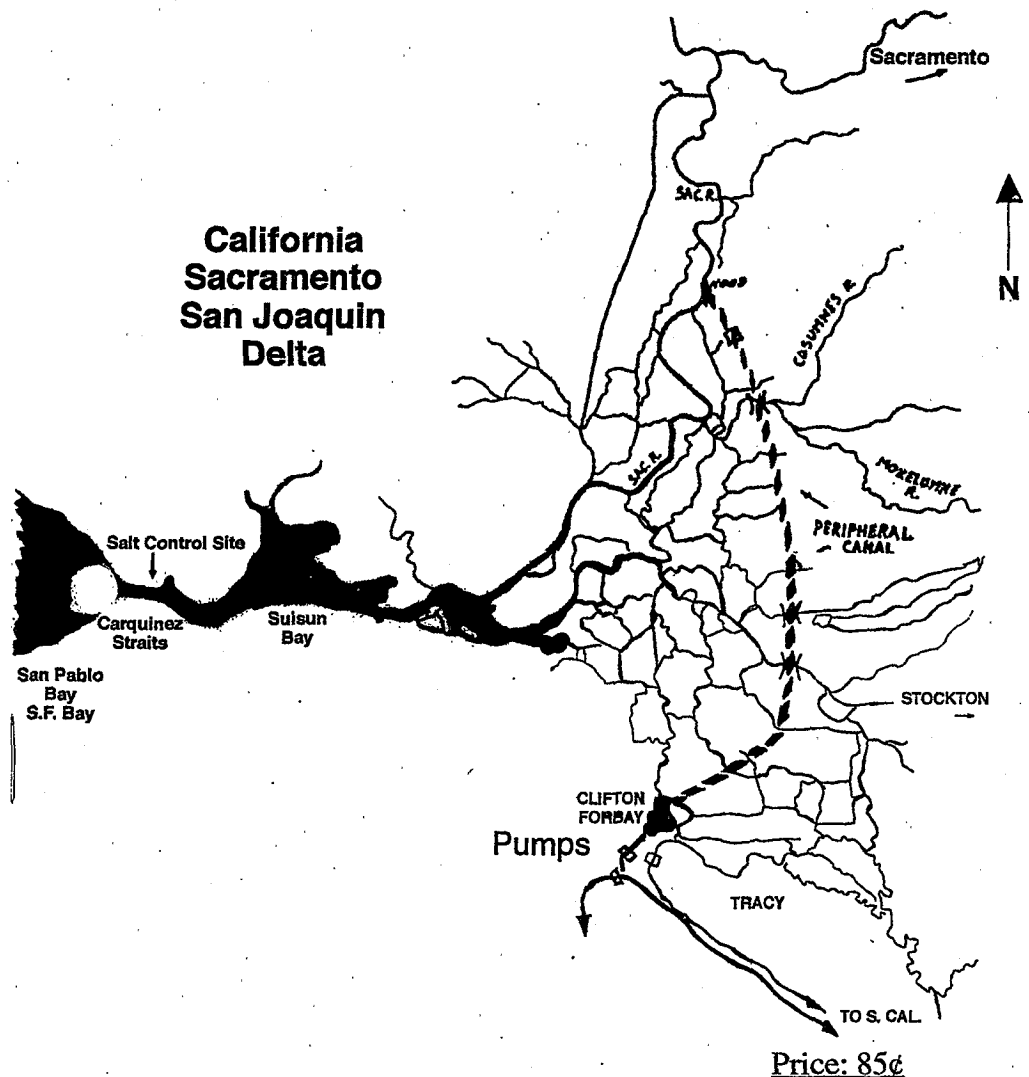


1997-1998

# CALIFORNIA WATER

*WASTE IT OR CONSERVE IT  
POLITICS VS. A BETTER SOLUTION*

ROBERT E. BOYDEN



## SYNOPSIS

This message is part history, part creative thinking and part criticism of bureaucracy-- It is not fiction.

It explains California's fresh water problems and why the government "solution" will not work. It also explains what the author, the committee and many others believe is a better solution that will not only cost far less, but will save many acre feet of fresh water annually that is now lost to the ocean. It also presents a proven example of the offered solution that is successfully operating today in another country.

You decide.

## *Chapter 1*

### BACKGROUND

Mullholland still lives today. His legacy is the story of California water. He spent half a lifetime buying land that controlled fresh water, drained two lakes, built a huge aqueduct, built reservoirs, built a dam that broke and he pulled water from the Colorado River-- all to promote the biggest real estate development in the State of California--the growth of greater metropolitan Los Angeles area and more. It is still growing.

The very early California's population growth started around San Francisco and the Bay, but soon after the Gold Rush in 1849, the population center started building in the southern part of the State at a faster rate than in the north and has continued ever since. Agriculture consumes about 75% of the water. Today the southern California population and the demand for water far exceeds the north.

The demand for water in southern California is now extending far beyond the Los Angeles area. The greater Imperial Valley, starting at Palm Springs and extending to San Diego is being planted in all manner of crops and the Los Angeles Metropolitan Water District is reselling northern water in that area. There is even a latent political pressure to divide California into two states that is primarily motivated by water demands.

75% of California water resources are north of Sacramento. Starting with McCloud River, the Feather, the Yuba, the Bear, the American, the Consumnes, the Mokelumne, the Sacramento, the San Joaquin, and many tributaries, all except that portion consumed or diverted into reservoirs eventually flows into the Sacramento delta and then through the Carquinez Straits into the San Francisco Bay and on into the Pacific Ocean.



Since the delta is below sea level almost to Sacramento, large quantities of fresh water has to be released from northern reservoirs to push back the tidal inflow through the Carquinez straits and the salt that comes with it.

A study made by the Department of Water Resources in the 1960's showed that from one-third to one-half of all California fresh water that flowed into the delta was lost into the ocean for the sole purpose of holding back tidal inflow.

## *Chapter 2*

### THE CANALS

After a few droughts (about every seven years), something more had to be done to supply the demand so D. W. R. came up with a plan called the "Peripheral Canal. This plan originally consisted of a huge ditch about 400 feet wide by 40 feet deep and 50 miles long, which would pump the fresh water from the Sacramento River at a small town called Hood (At this point the river is free of salt), take it peripherally around the delta to the pumps at Tracy for delivery to the south. This canal would have to cross over or under two other rivers and it was to have 12 release gates along the way to hold back the salty water before reaching the pumps. It was widely estimated to cost 2-5 million dollars. It would send the best quality of water to the south.

Fortunately, the public was wiser than the "experts" and it was heavily voted down.

The D. W. R. not wanting to accept the ballot box, came up with another brilliant idea. They decided to make it smaller and changed the name to "mini canal". The incumbent governor wisely scratched that idea, stating that "the public would

not be fooled by such a subterfuge".

The next move by the D. W. R. was unbelievable. They changed the name again to the "New Hope Canal", which turned out to be the upper half of the Peripheral Canal plus some changes (not too clearly defined) in the lower delta. Wisely again, the Governor scratched that idea, stating that the public would not be fooled by that either.

It is difficult to understand how a department of state government charged with such an important responsibility, would try to deceive the public and totally disregard the technical fact that use of the canal would take away fresh water the delta needed to hold back the tidal intrusion and salinize the whole delta unless more fresh water was used, if available, to perform that service. Salinizing the delta would destroy thousands of acres of first class farm land.

### *Chapter 3*

#### A BETTER PLAN

About the time the "canal" was first proposed and voted down, (1980), a volunteer committee was formed, using a different approach, to supply more fresh water to the south without damaging the delta or the north. The group consisted of 5 persons. Three were engineers, two of whom had experience with the Army Engineer Corps in the delta and the bay, one lived in the delta, and one who was inspector of dams on the Columbia River. Two were retired PG&E executives with water management experience, plus a Butte County Planning Commissioner --a knowledgeable group-- the best in the state. They also had the support of another Army Corps Engineer who managed the Army Delta-Bay Model in Sausalito from its inception, a true expert. The California Grange comprising

thousands of farmers and the five counties surrounding the delta supported the committee.

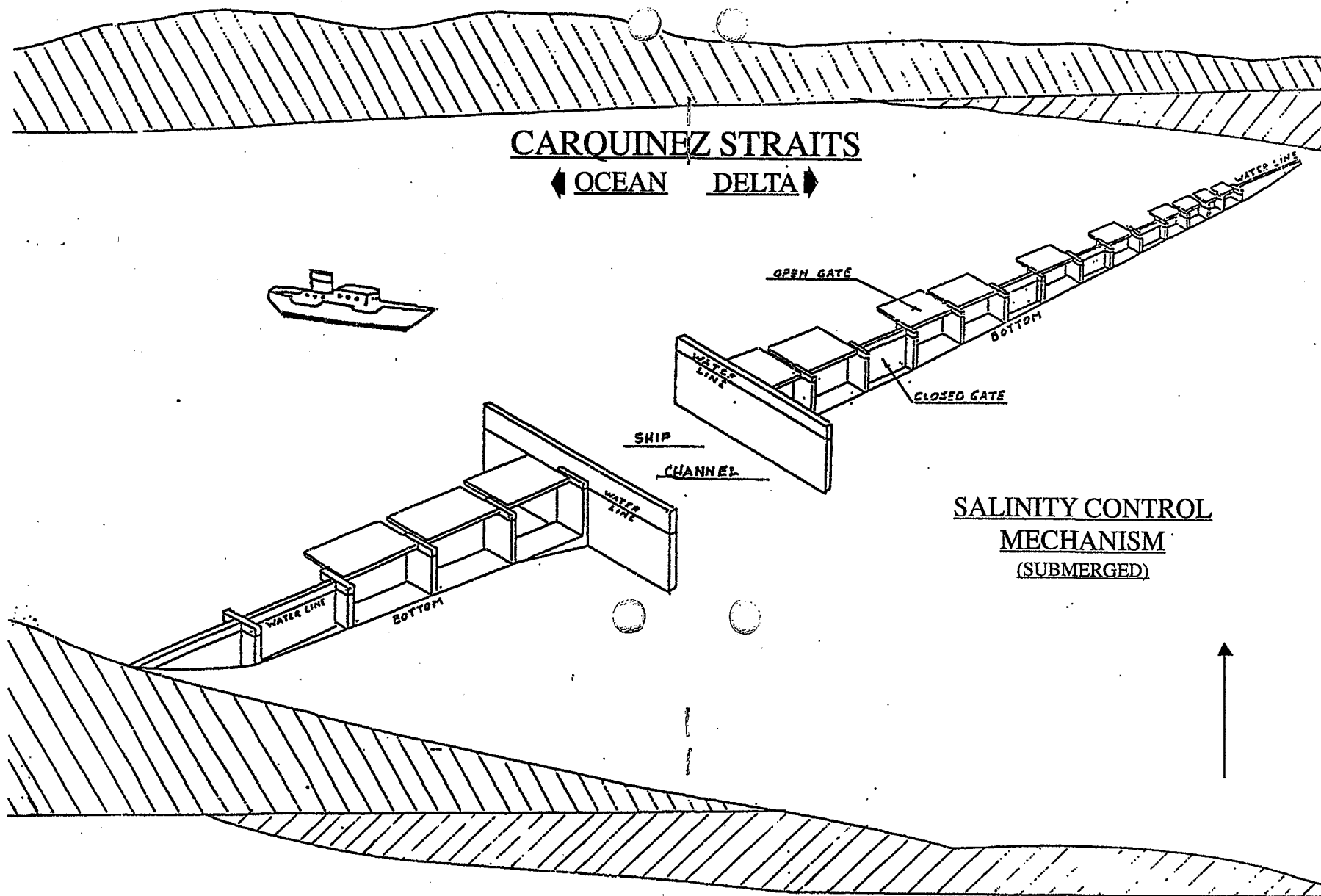
What is the greatest enemy of fresh water in California? It is a four letter word called SALT. Salt, primarily from the ocean or from agricultural runoff. There are presently only two things that prevent the delta from being salinized. One is the constrictive action against tidal inflow provided by a narrow neck of water between the Bay and the Delta called the "Carquinez Straits". The neck of water averages about one third mile wide, about fifty feet deep and is about eight miles long. If it should ever be opened up and dredged out salt water would reach clear to Sacramento. the other is the massive amounts of fresh water that flows or is released from northern reservoirs to hold back tidal intrusion.

So the committee went to work against salt and the tide. They came up with what might be called a "Salinity Control Mechanism". Ref. Dwg. pages 6 and 7 It consisted of about twenty submerged gates across the straits hinged near the top at water level, that swing open when the tide goes out (twice each day) and closed when the tide comes in allowing flow in one direction only, like a check valve. Salt water is heavier than fresh water, so the salty water flows out first. These gates to be monitored and computer controlled so that a portion or all can be locked open or closed on demand.

The water motion would provide all the forces needed to move the gates from one position to the other. After many tide reversals, the delta would be desalinized under control to the point where the anadromous fish would have a suitable climatizing zone. The mechanism would replace the volume of fresh water formerly needed to restrict tidal inflow.

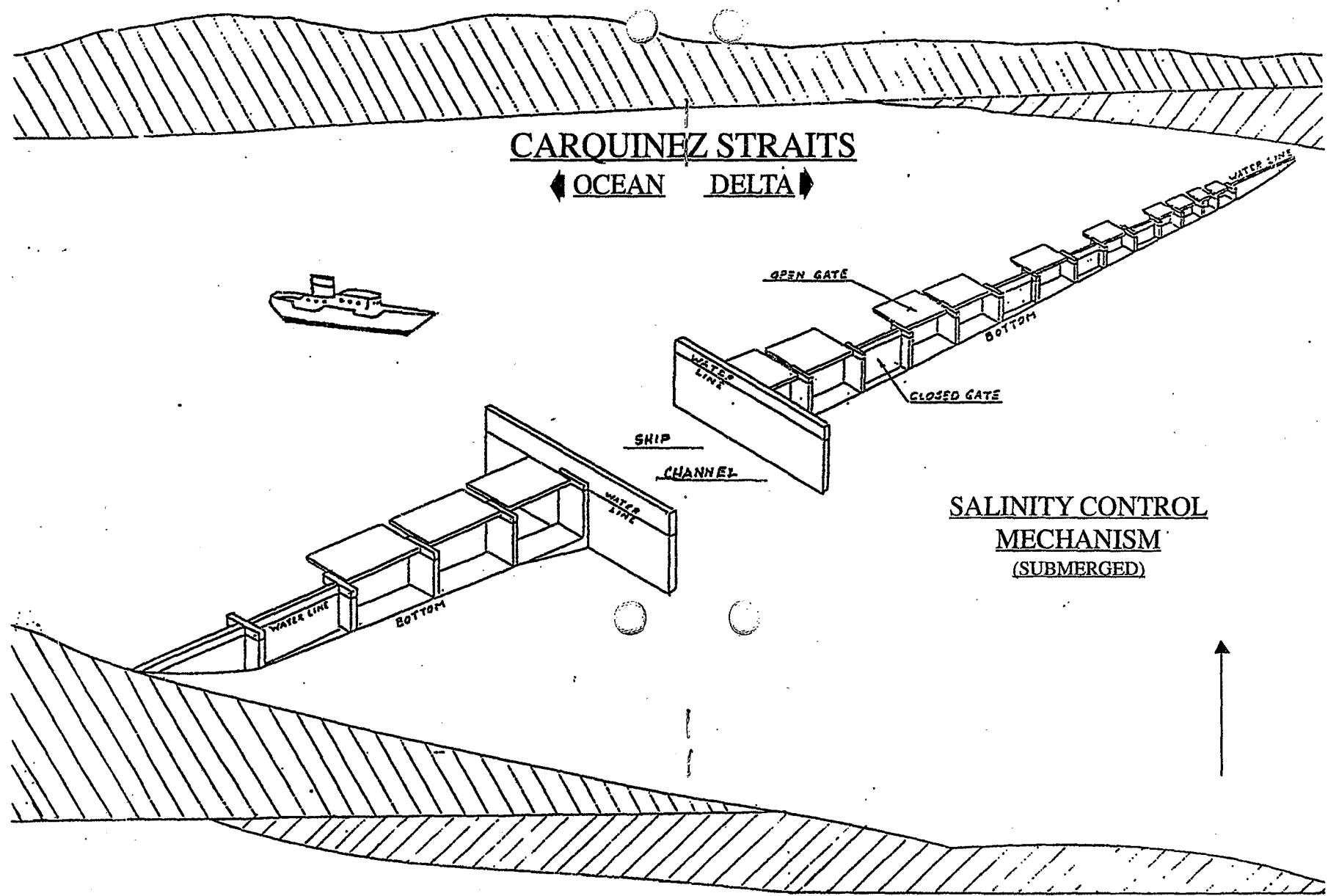
The mechanism had an additional capability- during combined heavy rain and heavy tide, inland flooding and pressure against the levees could be substantially reduced.

This plan was explained to the combined water





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committees of the California Senate and Assembly in about 1982. The Chairman instructed the Director of D. W. R to study it in depth. Subsequently meetings were held with D. W. R staff, including the Director. Two engineering firms were contacted to independent study the plan- Ch2M Hill company and the Dutch Delft Laboratories in Seattle, WA. Both firms stated that the plan showed merit and should be placed on the Army Corps test model in Sausalito. The cost was estimated at 400 million dollars. (Less than one-fifth of the cost of the Canal". A fifteen day test plan was prepared, a suitable site in the straits was selected and an approximate starting day was set.

One month later the D. W. R. Director issued a letter cancelling the whole project, stating that the mechanism would raise the water level in the San Francisco bay four feet.

This is a ridiculous statement. Tide finds approximately a uniform level regardless where it is restricted. So the project laid dormant until 1997.

#### *Chapter 4*

#### **MORE POLITICS**

Now in 1997 we have a program called CAL-FED. This politically oriented group was started by the State Governor reportedly to provide an oversight of the Bay and the Delta and provide solutions for better water use. They held public meetings around the State to gather different views. No summary of findings was published but a group of ten so-called "possible solutions" were issued with hypothetical graphics that explained nothing understandable. The written description of one solution exactly described the "Peripheral Canal" with

a different name. It was called "an isolated conveyance". These ten solutions were to be further studied and reduced to three solutions which were rather quickly done and sure enough, one of those three solutions was the "isolated conveyance".

This group is the beneficiary of a proposition placed on the 1996 November ballot deceptively called the "Clean Water Act". (Who can be against clean water?). They received the right to issue bonds up to nearly 1 billion dollars to provide various "solutions" involving, not clearly defined, water flows, fish benefits, and wastelands. A billion dollars won't build a canal but it could go a long way for political support.

Who is monitoring these expenditures?

It is interesting to note that all of the principals in this scenario are from southern California, including the Governor, the Director of the D. W. R. and the Director of Resources.

Our State Water Agency is determined to build a Peripheral Canal under a disguised name regardless of damage to the Delta. It is disturbing that deceit has to be a part of their effort.

## *Chapter 5*

### GROUND WATER

Overtures have now been made to obtain ground water from the North State or water rights replaced by ground water. Is there a difference?

The aquifer map of the United States shows that about two-thirds of the entire nation has water under it at one level or another. The primary levels are not connected in most parts of the country. No matter where a shaft is dug, one would eventually reach water. Naturally, ground water is more difficult

to find in the arid areas because subterranean storage comes from rainfall and rivers, etc.

Ground water is generally very desirable because it is often the purest. However, it also represents a decreasing portion of the total water volume due to an increased pumping. Ground water should be sacred to the local area and a reserve for emergencies. It should not be subject to transfer by mixing with other water.

## *Chapter 6*

### OVER-USED RIVER

The Colorado River once was a massive stream. Seven states, not counting Mexico, have used this magnificent river until it is now, at its lowest reaches, a sluggish, salty stream. California can count on this source for very little in the future.

## *Chapter 7*

### LEARN SOMETHING

A similar example of saving fresh water by restricting the tide has recently (1978) been successfully accomplished by our friends in Holland. (Ref. National Geographic Magazine, April 1968).

By similar methods to what is here proposed, the Dutch have not only created fresh water lakes from salt water estuaries, but have converted the entire Rhine River Delta to fresh water,

which formerly had salt water from the North Sea far into the river system.

The Dutch had a much more difficult problem than California because the North Sea has a much greater tidal rise and fall than our Bay (Five ft. -vs- fifteen ft. ) and the stormy North Sea is far less complacent than the San Francisco Bay.

California should be leader in this technology. So far it is not even a learner.

## *Chapter 8*

### CONCLUSION

Here we have an organized effort which is primarily politically oriented trying to solve the many problems of water quality and equitable distribution which are basically technical.

They are faced primarily with two major problems. #1- Salt from the ocean is gradually creeping into the Sacramento Delta which is a collection and distribution basin for about 75% of California water; thus requiring more fresh water to resist tidal inflow. #2. Finding a solution to increasing demands from the south that would not damage the north or the delta.

It takes only common sense to conclude that mechanically keeping salt out of the Delta instead of wasting more fresh water should be the right way to save water and money for both north and south. The sooner the better.

The Army Engineer Corps scale model in Sausalito was built to test water flows, volume, etc. in the delta and the bay and should be used to test the salinity control mechanism to determine exactly how much water is saved, design requirements, etc.

THERE IS NO POLITICAL SOLUTION TO A TECHNICAL PROBLEM.

## REGARDING THE AUTHOR

Robert E. Boyden lived in the California delta for eight years. Engineering education at the University of California, Berkeley, with later technical courses at UCLA and Cal-Tech. A 27 year Engineering career plus private consulting and experience with the Army Engineering Corps surveying the delta and the San Francisco Bay. 50+ patents. Retired.

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